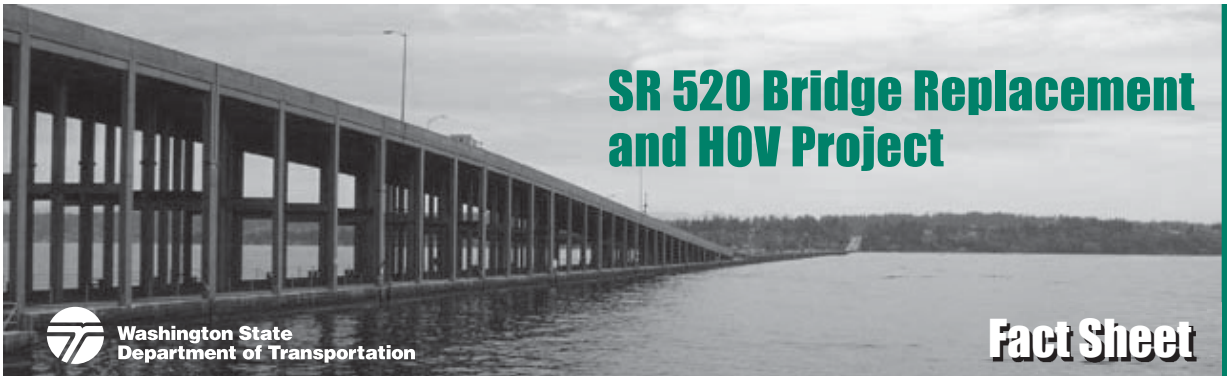


Winter 2006

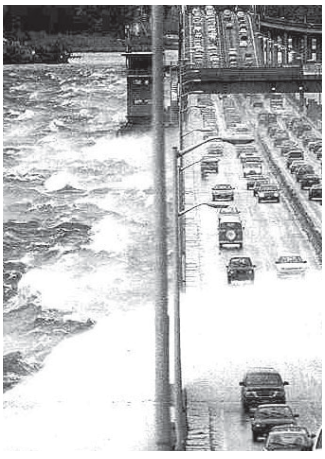
SR 520: Vulnerable to Earthquakes and Windstorms

Why do the SR 520 Evergreen Point Bridge and Portage Bay Bridge need to be replaced?

Built in the early 1960s, the Evergreen Point and Portage Bay bridges have endured dozens of winter windstorms, several earthquakes and various traffic and boating accidents. Additionally, the bridge is carrying almost double the amount of traffic that it was designed to hold. These incidents and increased traffic loads have taken their toll on the aging bridges, which were designed for use through 2015. However, a natural disaster, such as an earthquake or windstorm, could strike the area at any time between now and 2015, rendering the bridges unusable even before the end of their design lives.

What will happen if there is a major windstorm?

Today's sophisticated modeling indicates that the SR 520 floating bridge can safely withstand 57 mph winds, although it has withstood a few stronger windstorms (up to 77 mph) in the past 20 years. However, these major windstorms have damaged the structure significantly, requiring extensive repairs. Engineers now warn that additional windstorms of this magnitude could damage the bridge beyond repair. While it is difficult to predict winter weather, the chance is high that the SR 520 bridge will face another large storm before the end of its design life.



Waves crash onto SR 520 floating bridge

Additional problems include:

- **Cracked and Leaking Pontoons –** The floating bridge pontoons are cracked and leaking from past storm damage. Although they have been sealed and reinforced to reduce future damage, these repairs do not provide the same long-term benefits of a new, stronger bridge.

- **High Wind Speeds –** During strong winds, the near-shore anchor cables, which help the floating bridge stay in alignment, could break as they strain to hold the bridge in place.

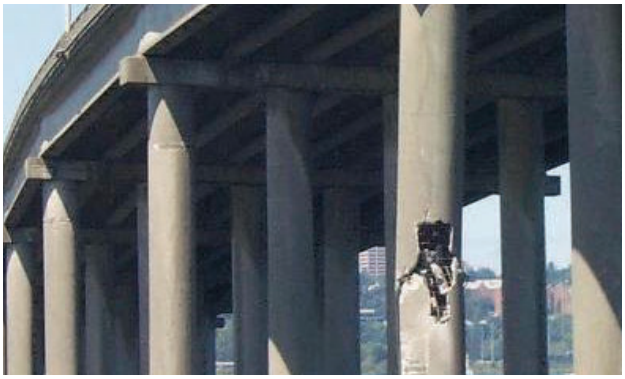
- **Retrofits –** The SR 520 bridge has had a number of safety and maintenance retrofits that have added weight to the structure, and as a result, the floating bridge sits one-foot lower in the water than originally designed. This lower profile leaves the bridge particularly susceptible to strong waves from windstorms. Further retrofits are not structurally feasible, as they would add more weight than the bridge could safely support.

What is a pontoon?

Pontoons are the hollow concrete structures that allow floating bridges to float. They are held together using steel cables and are anchored in place by massive concrete anchors in the water. The size of pontoons depends on the size of the bridge and the amount of traffic it carries.

What will happen if there is an earthquake?

Situated along the Pacific Ocean's "Ring of Fire," the Puget Sound region is a very seismically active area, susceptible to earthquakes and volcanic eruptions. A 7.9 magnitude earthquake that happened in Alaska in 2002 caused small amounts of damage to expansion joints, bearings and railings on parts of the bridge. And while the SR 520 bridge suffered little damage from the 2001 Nisqually earthquake, it is estimated that the bridge could have sustained extensive damage if the quake had lasted just 15 additional seconds.



Damage to bridge column from barge accident

This is due to:

- **Hollow Columns –** The Portage Bay Bridge and the west approach of the floating bridge were built with hollow columns, which could implode during an earthquake.

- **Column Caps –** The column caps are not strong enough to meet current design standards for bridges in an earthquake-prone region and could crumble during an earthquake if there was excessive friction between the bridge span and the column cap.

What other safety issues does the bridge have?

In addition to being vulnerable to windstorms and earthquakes, the bridge is narrow and lacks shoulders, which creates traffic back-ups when there is an accident or a stalled vehicle. Without shoulders, disabled vehicles cannot pull off the roadway and emergency vehicles cannot easily reach accidents. Each year, SR 520 averages 360 incidents – that's almost one traffic-blocking incident every day. With nowhere for affected vehicles to move, one small incident during rush hour can cause severe congestion and unreliable commute times throughout the day.

How will the new bridge be more safe and reliable?

WSDOT is designing the new bridge to meet current highway safety and design standards, reducing the risk of failure and increasing the reliability of the structure.

This includes:

- Building solid columns that can withstand earthquakes
- Raising the roadway of the floating bridge 26 feet off the water, increasing the distance of the road deck from high waves during storms
- Designing the structure to withstand higher wind speeds (92 mph)
- Eliminating the drawspan from the floating bridge, which is where most storm damage currently occurs
- Designing stronger and more buoyant pontoons that will be more stable
- Adding shoulders where disabled vehicles can pull out of traffic and emergency vehicles can reach accidents

How will WSDOT keep the bridge safe and the region moving until a new bridge can be built?

WSDOT has a comprehensive regional plan that will be followed in the event of an emergency. For the SR 520 bridge, WSDOT has:

- On-call emergency response staff at all times
- Around-the-clock electronic monitoring of the bridge structure
- Protocols in place to close the bridge when high wind and waves threaten drivers and the bridge's structural integrity
- Traffic management procedures in the event of a complete SR 520 shutdown, including detours, traveler information and traffic management
- Procedures to notify emergency and communications personnel, other agencies, and agency executives if needed
- Procedures to activate the Emergency Operations Center in North Seattle if needed
- Ongoing emergency response training for staff
- Ongoing coordination with other agencies and local jurisdictions

For More Information
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Washington State Department of Transportation